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## PROCEEDINGS.

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Eight hundred and eighty-third Meeting.

May 13, 1896. — ANNUAL MEETING.

VICE-PRESIDENT George L. Goodale in the chair.

The chair announced the death of Atticus Green Haygood, Associate Fellow.

The Corresponding Secretary read the following letters: from Charles Lane Poor and T. R. Lounsbury, acknowledging their election as Associate Fellows; from the Librarian of the Boston Public Library, announcing the preparation of a list of serial publications now taken in the principal local libraries, and inviting correspondence from persons owning periodicals not to be found in public collections and willing to offer them for occasional consultation; from the College of New Jersey, inviting the Academy to send a delegate to the sesquicentennial celebration of the founding of the College; and from the Principal of the University of Glasgow and the Lord Provost of Glasgow, inviting the Academy to appoint a representative to attend the jubilee of Lord Kelvin on the 15th and 16th of June next. The chair appointed William Everett delegate to the celebration at Princeton.\*

The Corresponding Secretary read the Report of the Council.

The Treasurer presented his annual report, of which the following is an abstract: —

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\* Mr. Everett being unable at the last moment to attend, his place was filled by the appointment of Horace E. Scudder, as substitute.

## GENERAL FUND.

*Receipts.*

Balance, May 1st, 1895 . . . . .		\$2,675.24
Sale of bonds . . . . .		15,233.75
		<u>17,908.99</u>
Assessments . . . . .	\$1,050.00	
Sale of publications . . . . .	<u>9.10</u>	\$1,059.10
Income from investments . . . . .		4,677.00
Return of bank tax . . . . .		51.51
Gift of E. C. Clarke . . . . .		100.00
Gift of F. H. Storer . . . . .		5.00
		<u>5,892.61</u>
		\$23,801.60

*Expenditures.*

General expenses . . . . .	\$2,039.00	
Publishing expenses . . . . .	1,939.14	
Library expenses . . . . .	<u>1,157.78</u>	\$5,135.92
Investments . . . . .		16,550.00
Balance . . . . .		<u>2,115.68</u>
		\$23,801.60

## RUMFORD FUND.

*Receipts.*

Balance May 1st, 1895 . . . . .		\$5,863.70
Sale of bonds . . . . .		3,550.00
Income . . . . .	\$1,952.00	
Return of bank tax . . . . .	<u>91.72</u>	2,043.72
		\$11,457.42

*Expenditures.*

Books and binding . . . . .	\$140.17	
Rent . . . . .	10.00	
Investigations . . . . .	1,000.00	
Publishing expenses . . . . .	71.42	
Rumford Medal . . . . .	<u>327.50</u>	1,549.09
Investments . . . . .		8,000.00
Balance . . . . .		<u>1,908.33</u>
		\$11,457.42

## WARREN FUND.

*Receipts.*

Balance, May 1st, 1895 . . . . .	\$374.89
Income . . . . .	840.00
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	\$1,214.89

*Expenditures.*

Investigations . . . . .	\$600.00
Balance . . . . .	614.89
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	\$1,214.89

## BUILDING FUND.

*Receipts.*

Balance, May 1st, 1895 . . . . .	\$843.68
Income . . . . .	445.00
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	\$1,288.68

*Expenditures.*

Investment . . . . .	\$1,000.80
Balance . . . . .	288.68
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	\$1,288.68

The Librarian presented his annual report, which showed that 3,096 books and pamphlets had been added to the Library during the year, 2,106 of which were obtained by gift and exchange, 748 by purchase with the appropriation from the General Fund, and 242 with the appropriation from the Rumford Fund. 345 volumes were bound at an expense of \$383.55, of which \$22.35 were charged to the Rumford Fund. The total expenditure for books, periodicals, and binding amounted to \$1,297.95, of which \$140.17 were charged to the Rumford Fund. 196 books were borrowed by thirty-five persons, of whom twenty-three were Fellows of the Academy.

The following reports were also presented : —

## REPORT OF THE RUMFORD COMMITTEE.

The Rumford Committee has considered since the last annual meeting of the Academy all possible candidates for the Rumford Medal, but has been unable to reach a conclusion, and therefore does not recommend any

one for the medal at this time. The Rumford Committee has been presented by Professor Marcou with copies of forty-eight letters written by Count Rumford to Professor Pictet of Geneva. The committee voted to recommend to the Academy that it authorize the printing at the expense of the Rumford Fund of the following four papers, and that a sum of \$25 be appropriated for illustration of these papers.

The titles of these papers are as follows : —

1. Thermo-electric Interpolation Formulæ, by S. W. Holman.
2. The Melting Points of Aluminum, Silver, Gold, Copper, and Platinum, by S. W. Holman with R. R. Lawrence and L. Barr.
3. Pyrometry : Calibration of the Le Chatelier Thermoelectric Pyrometer, by S. W. Holman.
4. Calorimetry : Methods of Cooling Correction, by S. W. Holman.

The committee voted to authorize the publication in the American Journal of Science of a preliminary account of an investigation on the thermal conductivities of certain kinds of stone, by Prof. B. O. Peirce and Dr. R. W. Willson. Professor E. H. Hall's paper on the Thermal Conductivity of Mild Steel was presented to the Academy, January 8, 1896, and has been published by the aid of the Rumford Fund.

It is the desire of the Committee that the vote of the Academy at its last annual meeting to appropriate from the Rumford Fund the sum of one thousand dollars, to be expended at the discretion of the committee in aid of investigations in light and heat, — payments from the sum to be made on the order of the Chairman of the Committee, — should be reaffirmed at the present meeting.

JOHN TROWBRIDGE,

*Chairman Rumford Committee.*

#### REPORT OF THE C. M. WARREN COMMITTEE.

I have to report that the recipients of the money granted by the Academy from the Cyrus M. Warren Fund have been doing good work.

This statement is borne out very emphatically by the publications of Professor Mabery, which are of a high order of excellence.

At the last annual meeting it was voted by the Academy "that the C. M. Warren Committee be requested to consider the propriety of appropriating \$50 from the income of the C. M. Warren Fund for the purchase of books relating to chemical research."

This question has been carefully considered by the committee. After full debate, it was voted that "In the opinion of the Committee no general appropriation for the purchase of books can properly be made from the C. M. Warren Fund."

F. H. STORER, *Chairman*.

On the recommendation of the Committee of Finance it was

*Voted*, To make the following appropriations from the income of the General Fund for the ensuing year : —

For general expenses . . . . .	\$1,950.00
For the Library . . . . .	1,350.00
For publications . . . . .	2,300.00

*Voted*, That the assessment for the ensuing year be five dollars (\$5.00).

In accordance with the recommendation of the Rumford Committee it was

*Voted*, That one thousand dollars (\$1,000) from the income of the Rumford Fund be placed at the disposal of the Rumford Committee, to be expended in aid of investigations in light and heat, payments to be made on the order of the Chairman of the Committee.

In accordance with the recommendation of the C. M. Warren Committee, it was

*Voted*, To appropriate six hundred dollars (\$600) from the income of the C. M. Warren Fund to C. F. Mabery, of Cleveland, Ohio, in aid of his researches on the chemistry of petroleum.

Upon motion it was

*Voted*, That the thanks of the Academy be tendered to Charles Loring Jackson for his faithful and efficient services as Corresponding Secretary.

The annual election resulted in the choice of the following officers and committees : —

ALEXANDER AGASSIZ, *President.*

BENJAMIN A. GOULD, *Vice-President for Class I.*

GEORGE L. GOODALE, *Vice-President for Class II.*

AUGUSTUS LOWELL, *Vice-President for Class III.*

SAMUEL H. SCUDDER, *Corresponding Secretary.*

WILLIAM WATSON, *Recording Secretary.*

ELIOT C. CLARKE, *Treasurer.*

HENRY W. HAYNES, *Librarian.*

*Councillors.*

HENRY MITCHELL,	} of Class I.
LEONARD P. KINNICUTT,	
EDWIN H. HALL,	

HENRY P. BOWDITCH,	} of Class II.
WILLIAM M. DAVIS,	
ROLAND THAXTER,	

ANDREW M. DAVIS,	} of Class III.
HORACE E. SCUDDER,	
JOHN E. HUDSON,	

*Member of Committee of Finance.*

AUGUSTUS LOWELL.

*Rumford Committee.*

JOHN TROWBRIDGE,	CHARLES R. CROSS,
ERASMUS D. LEAVITT,	AMOS E. DOLBEAR,
EDWARD C. PICKERING,	BENJAMIN A. GOULD,
ARTHUR G. WEBSTER.	

*C. M. Warren Committee.*

FRANCIS H. STORER,	HENRY B. HILL,
CHARLES L. JACKSON,	LEONARD P. KINNICUTT,
SAMUEL CABOT,	ARTHUR M. COMEY,
ROBERT H. RICHARDS.	

The chair appointed the following Standing Committees:—

*Committee of Publication.*

SAMUEL H. SCUDDER,                      SETH C. CHANDLER,  
CRAWFORD H. TOY.

*Committee on the Library.*

AMOS E. DOLBEAR,                      G. STANLEY HALL,  
SAMUEL HENSHAW.

*Auditing Committee.*

HENRY G. DENNY,                      JOHN C. ROPES.

In accordance with a vote adopted at the meeting of the 8th of April, the Rumford Premium, awarded at the last annual meeting to Thomas Alva Edison, was presented, John Trowbridge acting as Mr. Edison's proxy.

Vice-President Goodale, in presenting the medals, made the following remarks:—

It would be highly presumptuous for one whose knowledge of physics is of the most elementary character to occupy the time of the Academy by any statement of his own in conveying these medals. Happily such a course is unnecessary. The Chairman of the Rumford Committee has placed at our command a brief statement which makes clear the ground of the award.

“The Rumford Committee voted, June 22, 1893, that it is desirable to award the Rumford Medal to Thomas Alva Edison, in recognition of his investigation in the field of electric lighting, and they confirmed this vote on October 9, 1893, in the following words: ‘Voted for the second time to recommend to the Academy that the Rumford Medal be awarded to Thomas Alva Edison for his investigations in electric lighting.’

“The Committee reached the conclusion expressed by these votes after long deliberation and after careful sifting of all the evidence which was at their disposal in regard to Mr. Edison's claim for priority in the construction of the incandescent lamp, the conception of the central lighting station, together with the multitude of devices, such as the three-wire circuit, the disposition of the electric current feeders, and the necessary methods for maintaining the electric potential constant.



“The Committee felt that they could not decide upon Mr. Edison’s claims for priority in any particular invention in this new industry. Indeed, courts of law after prolonged litigation have found it difficult to decide how far Mr. Edison was in advance of contemporary workers. The task given to the Rumford Committee to decide who is the most worthy of the Rumford Medal, especially in the field of the application of electricity for the production of light and heat, is not an easy one. The number of investigators is now so large that it is no longer possible in general for one man to claim to be the first to apply electricity to a new field. The successful application is the result of many minds working on the same problem. Although the Committee did not feel justified in expressing the opinion that Mr. Edison invented the incandescent carbon filament lamp, or that he was the first to arrange such lamp in multiple on the circuit, thus producing what is popularly termed a subdivision of the electric light, or that the Edison dynamo had greater merits than the machine of Gramme and Siemens and others; still they are convinced that Mr. Edison gave a great impulse to the new industry, and that he was the first to successfully install a central electric lighting plant with the multitude of practical devices which are necessary. They believe that this impulse was due to his indefatigable application, to his remarkable instinct in whatever relates to the practical application of electric circuits, and to his inventive genius. They therefore have unanimously recommended to the Academy to bestow the Rumford Medals upon him, feeling that the work of Mr. Edison would especially appeal to the great founder of the medals, Count Rumford, if he were living.”

The Academy has accepted the report of the Rumford Committee, and has voted to confer the gold and the silver medal upon Mr. Edison. The recipient finds it impossible to be present at this meeting of the Academy, and has requested Professor Trowbridge to act as his proxy, and to receive the medals for him.

In the name of the Academy I beg you, Professor Trowbridge, to accept the charge of conveying these medals to Mr. Edison’s hands. It would be most ungracious for us who are assembled in this room, which is flooded by this steady and brilliant electric light, to withhold our personal thanks for what Mr. Edison’s investigations and practical activities have done for us all. And, hence, I may venture to say that our thanks and all good wishes are to be conveyed with the Rumford Medals.

Professor Trowbridge replied as follows:—

Mr. President and Gentlemen of the Academy, — I accept the medals for Mr. Edison, and at his request I wish to express his deep sense of the great honor the Academy has conferred upon him. His work in the field of electric lighting has been the subject of prolonged litigation, and at times he has had doubts in reading the opinions of learned experts whether this work has been original or whether he has really contributed anything to the world's progress. The recognition of his labors by the American Academy of Arts and Sciences, regarded by Count Rumford in his gifts as the coequal of the Royal Society of London, is therefore especially grateful to him. Acting as his proxy, I thank the members of the Academy for the distinction which they have by their votes conferred upon him.

The following papers were presented by title: —

A Revision of the Atomic Weight of Magnesium. By Theodore William Richards and H. G. Parker.

A Revision of the Atomic Weight of Strontium. Second Paper: The Analysis of Strontic Chloride. By T. W. Richards and H. G. Parker.

Contributions from the Gray Herbarium of Harvard University. New Series, No. 10: — 1. Revision of the Genus *Tridax*. 2. Synopsis of the Mexican and Central American Species of the Genus *Mikania*. 3. Revision of the Genus *Zinnia*. 4. Revision of the Mexican and Central American Species of the Genus *Calea*. 5. A Provisional Key to the Species of *Porophyllum* ranging north of the Isthmus of Panama. 6. Descriptions of new and little known Phanerogams, chiefly from Oaxaca. By B. L. Robinson and J. M. Greenman.

On the group of real Linear Transformations whose Invariant is a real Quadratic Form. By Henry Taber.

David W. Cheever read an obituary notice of Richard M. Hodges.

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**Eight hundred and eighty-fourth Meeting.**

October 14, 1896. — STATED MEETING.

The PRESIDENT in the chair.

The following deaths were announced: Thomas Tracy Bouvé and Francis James Child, Resident Fellows; George Brown

Goode and Hubert Anson Newton, Associate Fellows; and Heinrich Ernst Beyrich, Ernst Curtius, Friedrich August Kekulé, Baron Ferdinand von Mueller, and Jules Simon, Foreign Honorary Members.

In the absence of the Corresponding Secretary, Charles Loring Jackson was requested to act in his place, and read the following letters: from Karl Weinhold, Alexandre Kovalevsky, M. Foster, and B. L. Gildersleeve, acknowledging their election into the Academy; from a committee of the Society of Colonial Wars in the District of Columbia, proposing a joint memorial meeting in memory of George Brown Goode; from the International Geological Congress, enclosing the programme for its seventh session; from the Northwest Mining Association, suggesting the creation of a Department of Mines in the United States Government as a cabinet office; from the widow of Heinrich Ernst Beyrich, announcing the death of her husband; from the Academy "Gioenia" of Natural Sciences at Catania, announcing the death of its President, Giuseppe Zurria; from General-Major Rykatchew, reporting his appointment as Director of the Central Physical Observatory at St. Petersburg in place of Heinrich Wild, resigned; and from the committee of the British Association for the Advancement of Science on Zoölogical Bibliography and Publication, asking for the co-operation of learned societies in the method of publishing scientific papers.

James Coolidge Carter, of New York, was elected an Associate Fellow in Class III., Section 1, in place of the late Atticus Green Haygood.

Alpheus Hyatt read a paper entitled, *Cycle in the Life of the Individual (Ontogeny) and in the Evolution of its own Group (Phylogeny)*.

The following papers were presented by title:—

*The Constituents of Pennsylvania, Ohio, and Canadian Petroleum between 150° and 220°.* By Charles F. Mabery.

*Refractive Power of the Hydrocarbons and Chlorine Derivatives described in the Preceding Paper.* By Charles F. Mabery and Edward J. Hudson.

On the Butanes and Octanes in American Petroleum. By Charles F. Mabery and Edward J. Hudson.

On the Sulphur Compounds and Unsaturated Hydrocarbons in Canadian Petroleum. By Charles F. Mabery and William O. Quayle.

On the Composition of a South American Petroleum. By Charles F. Mabery and Arthur S. Kittelberger.

On the Specific Refractive Power of Petroleum Hydrocarbons, and some of their Derivatives. By Charles F. Mabery and Edward J. Hudson.

The Viscosity of Mercury Vapor. By A. A. Noyes and H. M. Goodwin.

Contributions from the Zoölogical Laboratory of the Museum of Comparative Zoölogy at Harvard College. E. L. Mark, Director. No. 73. — Studies in Morphogenesis. 6. A Contribution to the Quantitative Study of Correlated Variation and the Comparative Variability of the Sexes. By C. B. Davenport and C. Bullard.

*Voted*, To meet on adjournment on the second Wednesday in November.

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**Eight hundred and eighty-fifth Meeting.**

November 11, 1896. — ADJOURNED STATED MEETING.

VICE-PRESIDENT George L. Goodale in the chair.

As a quorum for business was not present it was

*Voted*, To meet on adjournment on the second Wednesday in December.

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**Eight hundred and eighty-sixth Meeting.**

December 9, 1896. — ADJOURNED STATED MEETING.

The Academy met at the house of the President in Cambridge.

The PRESIDENT in the chair.

The chair announced the death of Benjamin Apthorp Gould, Vice-President of the Academy for Class I., and of Hugo Gyl-dén, Foreign Honorary Member.

The Corresponding Secretary read a letter from James C. Carter, acknowledging his election as Associate Fellow.

On the motion of Charles L. Jackson it was

*Voted*, That the money received from the sales of publications in any year be appropriated for the publications of that year.

*Voted*, That the sum of four hundred and sixty-one dollars be added to the appropriation for publications this year, as this is the amount of the subscription raised to be used for publications, but not yet appropriated for this purpose.

On the motion of S. C. Chandler it was

*Voted*, To grant the use of the Hall of the Academy to the Colonial Society of Massachusetts on the third Wednesday of each of the five months December to April, in the same way as during the past year.

In view of the expected absence of the Recording Secretary, the President appointed William R. Livermore Recording Secretary *pro tempore*.

John E. Wolff exhibited a crystal of tourmaline from Paris, Maine, which had just been given to the Harvard Mineralogical Museum and is remarkable for its size and color. It is seven inches long, with a diameter varying from two to three inches, and weighs twelve hundred and twelve grammes, or two pounds eleven ounces avoirdupois. The color is a clear, transparent green, except at one end, where the crystal is tipped with red (rubellite) for half an inch. This is said to be the largest crystal of gem quality ever taken out from that famous locality.

William R. Livermore read a paper entitled, The Growth of the Roman Dominions in Europe from 650 B. C. to 200 A. D., illustrated by one hundred Sketches for an Atlas of Historical Geography.

The President described his recent explorations of the Florida elevated reefs, in connection with those of L. S. Griswold of Southern Florida.

**Eight hundred and eighty-seventh Meeting.**

January 13, 1897.—STATED MEETING.

The PRESIDENT in the chair.

The chair announced the death of Francis Amasa Walker, Resident Fellow; Henry Newell Martin, Associate Fellow; and Emil Heinrich Du-Bois Reymond, Foreign Honorary Member.

The Corresponding Secretary read letters from the Secretary of the Pasteur Committee in Washington, announcing the opening of subscriptions in America, and inviting the Academy to participate, and from the Observatory of San Salvador announcing the death of its director, Don Alberto Sanchez.

The vacancies occasioned by the death of Benjamin A. Gould were filled by the election of

JOHN TROWBRIDGE, *Vice President for Class I.*

THEODORE W. RICHARDS, *Member of the Rumford Committee.*

On the recommendation of the C. M. Warren Committee it was

*Voted*, That the sum of two hundred dollars (\$200) from the income of the C. M. Warren Fund be granted to H. O. Hofman, of Boston, for the prosecution of a research on the formation temperatures of slags in the smelting of ores of lead and copper or other metals.

S. H. Scudder read by title a paper on The Genera of North American Melanopli.

A. Lawrence Rotch read a paper on Obtaining Meteorological Records in the Upper Air by Means of Kites and Balloons.

**Eight hundred and eighty eighth Meeting.**

February 10, 1897.

The Academy met at the house of A. Lawrence Rotch.

The PRESIDENT in the chair.

The following papers were read:—

The Hebrew and Muhammedan Calendars. By William E. Story.

Forts Henry and Donelson. By John C. Ropes.

**Eight hundred and eighty-ninth Meeting.****March 10, 1897. — STATED MEETING.**

VICE-PRESIDENT John Trowbridge in the chair.

The Corresponding Secretary read a letter from the Royal Academy of Sciences of Turin, announcing the death of Luigi Schiaparelli; also, one giving notice of the terms for competition for the eleventh Bressa prize.

The chair appointed the following committee to nominate officers for the ensuing year: —

Leonard P. Kinnicutt, of Class I., Henry P. Bowditch, of Class II., and Andrew M. Davis, of Class III.

The following gentlemen were elected Members of the Academy: —

Charles Henry Fernald, of Amherst, to be a Resident Fellow in Class II., Section 3 (Zoölogy and Physiology).

Ludwig Boltzmann, of Vienna, to be a Foreign Honorary Member in Class I., Section 2 (Physics), in place of the late Friedrich August Kekulé.

Wilhelm Pfeffer, of Leipsic, to be a Foreign Honorary Member in Class II., Section 2 (Botany), in place of the late Baron Ferdinand von Mueller.

Wilhelm Dörpfeld, of Athens, to be a Foreign Honorary Member in Class III., Section 2 (Philology and Archæology), in place of the late Ernst Curtius.

The following papers were read: —

International Bimetallism. By George S. Boutwell.

On the Minimal Nutrients of Bacteria in Water. By W. T. Sedgwick and D. D. Jackson.

An Investigation of some of the Bacteriological Aspects of the Art of Tanning. By S. C. Prescott. (By invitation.)

The Energy Conditions necessary to produce the Röntgen Rays. By John Trowbridge. (By title.)

## Eight hundred and ninetieth Meeting.

April 14, 1897.

The Academy met at the house of John C. Ropes.

VICE-PRESIDENT George L. Goodale in the chair.

The chair announced the death of James Joseph Sylvester and Karl Weierstrass, Foreign Honorary Members in Class I, Section 1.

The following papers were read : —

The study of English at Harvard College. By Barrett Wendell.

Electricity and Ether. By Arthur G. Webster.

The following papers were presented by title :—

A Measure of Variability and the Relation of individual Variations to specific Differences. By Edwin Tenney Brewster. Presented by E. L. Mark.

Contributions from the Gray Herbarium of Harvard University. New Series, No. XI. — 1. Revision of the Mexican and Central American Species of *Houstonia*. 2. Key to the Mexican Species of *Liabum*. 3. Descriptions of new and little known Plants from Mexico. By J. M. Greenman. Presented by B. L. Robinson.